Abstract of the Disclosure

Base station identification and downlink synchronization are realized by employing pilots including known symbols transmitted at prescribed frequency tones in individual ones of prescribed time intervals. Specifically, the symbols used in the pilots are uniquely located in a time- frequency grid, where the locations are specified by periodic pilot tone hopping sequences. In a specific embodiment of the invention, a period of a pilot tone hopping sequence is constructed by starting with a Latin-square based hopping sequence, truncating it over time, and possibly offsetting and permuting it over frequency. Particular examples of pilot tone hopping sequences are parallel slope hopping sequences in which the periodicity of the sequences is chosen to be a prime number of symbol time intervals. In another embodiment of the invention, a notion of phantom pilots is employed to facilitate use of various system parameters while accommodating the above noted pilot tone hopping sequences. That is, based on system considerations the frequency range of the above generated pilot tone hopping sequences exceeds the available bandwidth of a particular system, which would be a problem. This problem is overcome by truncating the pilot tone hopping sequences whenever the tone frequency exceeds the bandwidth, that is, designating these tones as phantom pilot tones and not transmitting them.